1. **What is Power BI and how does it differ from Excel?**

**Ans.** Power BI is a business intelligence tool used to visualize, analyze and share data interactively, mainly through dashboards and reports.

Difference from Excel:

* Excel is mainly for data entry, analysis, and calculations.
* Power BI is for advanced data visualization, connecting to large datasets, and creating interactive dashboards.
* Power BI handles big data better and is designed for reporting and decision-making, while Excel is more for day-to-day calculations and analysis.

1. **Explain the concept of data modeling in Power BI.**

**Ans.** Data Modeling in Power BI means organizing and connecting your data in a way that makes analysis easier and more meaningful.

In Power BI, we often bring data from different sources. But these data tables are usually separate and unorganized. Data modeling helps to:

* Create relationships between tables (like connecting a “Sales” table with a “Products” table through a common column, such as Product ID).
* Remove duplication and errors, so the data is clean.
* Add new calculated fields or measures (like profit, growth percentage, or average sales).

1. **What are the different types of connections available in Power BI?**

**Ans.** Types of Connections in Power BI:

When we bring data into Power BI, there are mainly three types of connections:

1. Import – The data is copied into Power BI.

* Best for smaller to medium datasets.
* Reports are faster because the data is stored inside Power BI.
* But you need to refresh it to get the latest updates.

1. DirectQuery – The data stays in the original sources and Power BI only fetches it when needed.

* Useful for very large datasets.
* Always shows real-time or up-to-date data.
* But reports can be a little slower since it queries the source every time.

1. Live connection – Similar to DirectQuery, but it’s mostly used with tools like SQL Server Analysis Services (SSAS).

* Data is not imported; it stays in the server.
* Power BI only visualizes it.
* All calculations are handled by the server.

1. **How do you handle data transformation in Power BI?**

**Ans.** Data transformation in Power BI is done mainly through the Power Query Editor. This is a built-in tool that helps clean, shape, and prepare raw data before using it in reports.

Some common ways we handle data transformation are:

* Removing errors or duplicates – so the data is clean.
* Changing data types – for example, turning text into numbers or dates.
* Merging or Splitting Columns – like combining first name and last name, or breaking a full address into parts.
* Filtering rows – keeping only the useful data.
* Creating new columns – for calculations or grouping.
* Combining data from multiple sources – such as joining sales data with customers details.

1. **What is DAX (Data Analysis Expressions) and why is it important in Power BI?**

**Ans.** DAX (Data Analysis Expressions) is a formula langauge in Power BI used to create calculations, measures, and custom columns. It helps us to go beyond the raw data and perform advanced analysis.

Importance: DAX makes Power BI powerful because it allows us to create meaingful insights, not just display data. Without DAX, Power BI would only show basic information, but with DAX we can answer complex business questions.

1. **Can you explain the difference between calculated columns and measures in Power BI?**

**Ans.** Difference between calculated columns and measures in Power BI

* Calculated Columns: These are new columns we can add to a table. The calculation happens row by row, and the result is stored in the data model.

Example: Profit = Sales – Cost (Shown for each row).

* Measures: These are calculations done on the fly, based on the data in our report. They don’t store values in the table but calculate when we use them in visuals.

Example: Total sales = SUM (Sales [Amount]) (Calculated only when needed).

1. **How do you handle relationships between tables in Power BI?**

**Ans.** Relationships in Power BI are handled by connecting tables through common fields, usually called keys. These links allow data from different tables to work together in reports. Relationships can be one-to-one, one-to-many, or many-to-many, depending on the data. Power BI automatically detects some relationships, but they can also be created or edited manually. This makes it possible to analyze and visualize data from multiple tables as if they were a single dataset.

1. **What is the purpose of a Power BI Gateway?**

**Ans.** The purpose of a Power BI Gateway is to act as a bridge between on-premises data sources and the Power BI service. It allows secure transfer of data so that reports and dashboards in Power BI stay updated without moving the actual data to the cloud.

1. **How can you schedule data refresh in Power BI Service?**

**Ans.** Data refresh in Power BI Service can be scheduled by setting a refresh frequency for a dataset. Once scheduled, the service automatically connects to the data source at the chosen times and updates the reports and dashboards with the latest data.

1. **Explain the concept of row-level security in Power BI.**

**Ans.** Row-level security (RLS) in Power BI is a feature used to control access to data at the row level. It restricts what data each user can see based on filters or rules applied to roles. For example, a sales manager might only see data for their own region. This ensures that sensitive information is protected and that each user views only the data relevant to them.

1. **What is the Power BI Desktop and how does it differ from Power BI Service?**

**Ans.** Power BI Desktop is an application installed on a computer that is used to connect to data sources, clean data, build data models, and design reports. Power BI Service is the online platform where those reports and dashboards are published, shared, and accessed through a web browser.

The main difference is that Power BI Desktop is mainly for creating and preparing reports, while Power BI Service is for sharing, collaboration, and viewing reports online.

1. **Explain the concept of Direct Query in Power BI.**

**Ans.** DirectQuery in Power BI is a method of connecting to a data source without importing the data into Power BI. Instead, the data stays in the original source, and queries are sent live whenever visuals or reports are used. This keeps the reports always updated with the latest data but may depend on the speed and performance of the source system.

1. **What are Power BI templates and how are they useful?**

**Ans.** Power BI templates are pre-designed report files that contain layouts, visuals, and data model definitions but do not include the actual data. They are useful because they allow the same report structure to be reused with different datasets, saving time and ensuring consistency across multiple reports or projects.

1. **How do you handle incremental data refresh in Power BI?**

**Ans.** Incremental Data Refresh in Power BI updates only new or changed data instead of reloading the whole dataset. It uses a date column with parameters to filter data and applies refresh policies, making large datasets faster and more efficient.

1. **What is the role of Power Query in Power BI?**

**Ans.** Power Query is used for data connection, cleaning, and transformation before loading it into Power BI. It helps to remove errors, filter, merge, and shape data from multiple sources so that the data becomes ready for analysis and reporting.

1. **Explain the difference between calculated columns and calculated tables in Power BI.**

**Ans.** Difference between calculated columns and calculated tables in Power BI:

* Calculated Column: A new column created withinan existing table using DAX. It works row by row and is stored in the model.
* Calculated Table: A whole new table created using DAX expressions, often derived from exisitng tables.

1. **How do you create custom visuals in Power BI?**

**Ans.** Creating Custom Visuals in Power BI:

Custom visuals in Power BI are created when the built-in visuals are not enough.

1. Download from AppSource – Import ready-made custom visuals from Microsoft’s marketplace.
2. Import a visual file (.pbiviz) – Use visuals created by developers and add them into your report.
3. Build your own – Developers can use tools like Power BI Developer Tools to code a custom visual, package it as .pbiviz, and then import it into Power BI.
4. **What are the best practices for optimizing performance in Power BI?**

**Ans.** Best Practices for optimizing Performance in Power BI:

1. Use star schema instead of complex joins.
2. Reduce data size by removing unnecessary columns/rows.
3. Use measures instead of calculated columns where possible.
4. Enable incremental refresh for large datasets.
5. Optimize DAX queries for efficiency.
6. Use aggregations and summarizations instead of details raw data.
7. Limit visuals per report page to avoid slow rendering.
8. **How can you integrate Power BI with other Microsoft products like Azure and Office 365?**

**Ans.** Integration of Power BI with Microsoft Products:

* With Azure: Power BI connects to Azure services like Azure SQL Database, Azure Synapse, Azure Data Lake to fetch and analyze large-scale cloud data.
* With Office 365: Power BI integrates with Excel, Teams and Sharepoint, allowing users to publish reports, collaborate, and share insights easily within Office apps.

1. **Explain the concept of aggregations in Power BI.**

**Ans.** Aggregations are a way to summarize large datasets into smaller, pre-calculated tables. Instead of loading all detailed data, Power BI uses these aggregated tables to answer queries quickly. This improves performance and reduces memory usage, especially with big data.

1. **How do you handle error handling and data quality in Power BI?**

**Ans.** Handling Error Handling and Data Quality in Power BI:

* Use Power Query to clean data: remove duplicates, handle null values, change data types, and replace errors.
* Apply data validation rules (like checking ranges, formats).
* Use conditional columns or custom error handling to flag incorrect values.
* Regularly monitor refresh logs in Power BI service to detect and fix data load issues.

1. **What is the purpose of Power BI Embedded and when would you use it?**

**Ans.** Purpose of Power BI Embedded:

Power BI Embedded lets developers embed interactive Power BI reports and dashboards into custom applications or websites. It provides analytics to app users without needing them to log into Power BI separately.

When to use it:

* When a business wants to give data insights inside its own app.
* When external users need reports without having a Power BI license.